

# **LIFTER**

## **BACKGROUND OF THE INVENTION**

### **1. Field of the Invention:**

The present invention relates to a lifter for lifting a heavy  
5 load and, more particularly, to such a lifter, which is safe and  
durable in use.

### **2. Description of the Related Art:**

When lifting weights in a narrow place where a tower  
host or crane is not workable, a lifter may be used. Various  
10 lifters have been disclosed. There is known a lifter, which is  
comprised of a lifting main unit, a motor, and a transmission  
gearbox. The lifting main unit comprises an outer tube, and a  
telescopic tube mounted in the outer tube. The telescopic tube is  
formed of three inner tubes that slide one inside another. Each  
15 inner tube has the top and bottom sides respectively mounted  
with a pulley. The gearbox is coupled to the motor and adapted  
to rotate a winch, causing the winch to roll up or let off a cable,  
which has one end fastened to the winch and the other end  
extended in proper order through the pulleys at the top and  
20 bottom sides of each inner tubes and then fixedly connected to  
the bottom side of the last inner tube. When starting the motor to  
turn the transmission gear of the gearbox forwards/backwards,

the winch is driven to roll up/let off the cable, thereby causing the telescopic tube to be extended out of or received inside the main tube. This structure of lifter is not safe in use. If the cable broke during operation, the lifter becomes unworkable, and an  
5 accident may occur. Further, because notches are made in the main tube and the inner tubes for accommodating the pulleys. The structural strength of the tubes is weakened.

### **SUMMARY OF THE INVENTION**

The present invention has been accomplished under the  
10 circumstances in view. It is one object of the present invention to provide a lifter, which can easily be operated to lift the load with less effort. It is another object of the present invention to provide a lifter, which has a simple structure. It is still another object of the present invention to provide a lifter, which is safe  
15 in use. It is still another object of the present invention to provide a lifter, which is strong and durable in use.

To achieve these and other objects of the present invention, the lifter comprises a hollow main upright, said hollow main upright having a top side and a bottom side; a  
20 frame pivoted to said hollow main upright; a link coupled between said hollow main upright and said frame; a winch carried on said frame; at least one hollow auxiliary upright

axially movably mounted in said hollow main upright, said at least one hollow auxiliary upright each having a top side and a bottom side; a lifting upright axially movably mounted in said at least one hollow auxiliary upright; at least one first pulley  
5 respectively provided at the top side of said hollow main upright; at least one second pulley respectively provided at the top side of each said hollow auxiliary upright; at least one first cable, said at least one first cable each having a first end fixedly fastened to said winch and a second end extended through one  
10 said at least one first pulley and then extended into the inside of said hollow main upright and fixedly fastened to the bottom side of one said at least one hollow auxiliary upright and adapted to lift said at least one hollow auxiliary upright out of said hollow main upright upon operation of said winch; and at least one  
15 second cable respectively extended through said at least one second pulley and coupled between the top side of said hollow main upright and the bottom side of said lifting upright and adapted to lift said lifting upright upon operation of said winch after said at least one hollow auxiliary upright has been  
20 extended out of said hollow main upright.

## **BRIEF DESCRIPTION OF THE DRAWINGS**

FIG. 1 is an elevational view of a lifter according to the

present invention.

FIG. 2 is a sectional view of the lifter according to the present invention.

FIG. 3 is a schematic drawing showing the action of the  
5 lifter according to the present invention.

#### **DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT**

Referring to FIGS. 1 and 2, a lifter in accordance with the present invention is shown comprised of a wheeled carriage 12, a hollow main upright 10 mounted on the wheeled carriage 12 in vertical, a frame 14 pivoted to the hollow main upright 10,  
10 a hand winch 16 carried on the frame 14, a link 15 coupled between the bottom side of the hollow main upright 10 and a middle part of the frame 14, a hollow auxiliary upright 18 axially (vertically) movably mounted in the hollow main upright  
15 10, a lifting upright 29 axially (vertically) movably mounted in the hollow auxiliary upright 18, a platform 30 fixedly provided at the top side of the lifting upright 29, a first pair of pulleys 22 bilaterally provided near the top of the hollow main upright 10 and arranged in parallel, a second pair of pulleys 24 bilaterally  
20 provided near the top of the hollow auxiliary upright 18 and arranged in parallel, two first cables 26 each having one end fixedly fastened to the winch 16 and the other end respectively

extended through the first pulleys 22 and then turned downwards into the inside of the hollow main upright 10 and then fixedly fastened to the bottom side of the hollow auxiliary upright 18, and two second cables 28 each having one end fixedly fastened  
5 to the top side of the hollow main upright 10 and the other end respectively extended through the second pulleys 24 and then turned downwards into the inside of the hollow auxiliary upright 18 and then fixedly fastened to the bottom side of the lifting upright 30.

10 Referring also to FIG. 3, when wishing to lift a heavy load put on the platform 30, move the hand winch 16 with the hands to a relatively higher elevation (by means of the support of the link 15, the hand winch 16 can easily be turned with the coupling frame 14 to a relatively higher elevation), and then  
15 operate the hand winch 16 to wind up the first cables 26 and to further lift the hollow auxiliary upright 18. At this time, the second pulleys 24 are moved upwards with the hollow auxiliary upright 18. Because the second cables 28 are respectively extended through the second pulleys 24 and fixedly connected  
20 between the top side of the hollow main upright 10 and the bottom side of the lifting upright 20, upward movement of the second pulleys 24 with the hollow auxiliary upright 18 causes

the second cables 28 to be driven to lift the lifting upright 20 and the heavy load on the platform 30.

The aforesaid first pulleys 22, second pulleys 24, first cables 26 and second cables 28 form two pulley blocks that  
5 function in the same way, i.e., one first pulley 22 forms with one second pulley 24, one first cable 26 and one second cable 28 a pulley block. Therefore, when one first cable 26 or second cable 28 broken suddenly during lifting, the lifter still keeps working without causing an accident.

10 In the aforesaid embodiment, the hollow main upright 10 is fixedly mounted on the wheeled carriage 12. By means of the wheeled carriage 12, the lifter can easily be moved from place to place. Alternatively, the hollow main upright 10 can be fixedly mounted on a fixed mount or the like. A hollow auxiliary  
15 sub-upright may be provided between the hollow auxiliary upright 18 and the lifting upright 20 to increase the lifting range of the lifter. In this case, the second cables 28 each have one end fixedly fastened to the top side of the hollow main upright 10 and the other end respectively extended through the second  
20 pulleys 24 and then turned downwards into the inside of the hollow auxiliary upright 18 and then fixedly fastened to the bottom side of the hollow auxiliary sub-upright, and two third

cables are arranged each having one end fixedly fastened to the top side of the hollow auxiliary upright 18 and the other end extended through a respective third pulley at the top side of the auxiliary sub-upright and then turned downwards into the inside of the hollow auxiliary sub-upright and then fixedly fastened to the bottom side of the lifting upright 30. Further, safety means, for example, a safety lock may be used to prevent reverse rotation of the hand winch 16.

A prototype of lifter has been constructed with the features of FIGS. 1~3. The lifter functions smoothly to provide all of the features discussed earlier.

Although a particular embodiment of the invention has been described in detail for purposes of illustration, various modifications and enhancements may be made without departing from the spirit and scope of the invention.